

Sexual Orientation and Risk Factors for Suicidal Ideation and Suicide Attempts Among Adolescents and Young Adults

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Same-gender sexual orientation has been repeatedly shown to exert an independent influence on suicidal ideation and suicide attempts, suggesting that risk factors and markers may differ in relative importance between lesbian, gay, and bisexual individuals and others. Analyses of recent data from the National Longitudinal Study of Adolescent Health revealed that lesbian, gay, and bisexual respondents reported higher rates of suicidal ideation and suicide attempts than did heterosexual respondents and that drug use and depression were associated with adverse outcomes among heterosexual respondents but not among lesbian, gay, and bisexual respondents. (*Am J Public Health*. 2007;97:2017–2019. doi:10.2105/AJPH.2006.095943)

Compared with their heterosexual peers, lesbian, gay, and bisexual (LGB) youths report elevated rates of suicidal ideation and attempted suicide.^{1–6} Same-gender orientation is independently associated with suicidal behavior,^{7–11} raising the possibility that risk markers for suicidal behavior may differ in their relative importance between LGB and non-LGB individuals because of interaction effects between these markers and sexual orientation. If this is true, interventions that generically target risk markers without regard to sexual orientation may be differentially effective¹² and therefore do little to

address the underlying disparity. We explored potential differences between groups by examining the statistical interaction between LGB status and putative markers of risk in different subgroups.¹³

METHODS

In an attempt to identify potential interactions between sexual orientation status and risk factors for suicide ideation or suicide attempts among adolescents and young adults, we analyzed data from the National Longitudinal Study of Adolescent Health, a prospective cohort study that followed a nationally representative sample of adolescents into young adulthood. The study's sampling design is described elsewhere.^{14,15} We analyzed wave 3 data, which contained a weighted sample of 14 322 respondents, aged 18 to 26 years, who were surveyed during August 2001 through April 2002.

Sexual orientation was measured with 1 forced-choice self-description. Consistent with (problematic) convention,^{16,17} those who described themselves as bisexual, mostly homosexual, or exclusively homosexual were coded as LGB. Respondents who identified as exclusively or mostly heterosexual, or not sexually attracted to either males or females, were coded as non-LGB. Demographic variables included age, gender, race, ethnicity, and residence status.

Suicide attempts and suicidal ideation within the past 12 months were each measured with 1 item,^{18,19} which was dichotomized. Problem drinking and problem drug use in the preceding 12 months were coded as present if the respondents answered yes to any of the 6 items in each domain. Depression was measured in the adolescent health survey with 9 items from the Center for Epidemiologic Studies Depression Scale.²⁰ A factor analysis revealed 1 robust factor containing 7 items. Responses were summed across these 7 items.

Statistical analyses were performed with Stata version 8 (Stata Corp, College Station, Tex). Race, gender, and age were covaried in all multivariate analyses. After conducting descriptive analyses, we conducted regressions to examine the relationship between predictors (depression, problem alcohol use, and problem

drug use) and outcomes (suicidal ideation and suicide attempts) in the 2 strata (LGB and non-LGB). Next, we used interaction models to test whether the strength of the relationship between predictors and outcomes differed for the 2 groups of respondents. Each model included 1 of the 3 putative predictors along with LGB status and an interaction term for LGB and the putative predictor. The *t* value associated with the product term was used to determine if the interaction was significant,²¹ and the exponent was used to assess the effect size. Listwise deletion was used for each model tested.

RESULTS

Table 1 shows the descriptive and demographic factors for respondents with completed item responses. LGB respondents reported higher rates of suicidal ideation and suicide attempts than did non-LGB respondents after we controlled for race, gender, and age.

Stratified analyses (Table 2) showed that problem drinking, problem drug use, and depression were associated with elevated risk for suicidal ideation and suicide attempts among non-LGB respondents. Problem drinking and depression increased risk for suicidal ideation among LGB respondents; drug use did not. Problem drinking, drug use, and depression were not associated with increased risk for suicide attempts among LGB respondents. The interaction models revealed that suicidal ideation was associated with problem drug use and that suicide attempts were associated with depression among non-LGB respondents (Table 3).

DISCUSSION

To our knowledge this is the first study to describe the relative differences in risk markers for suicidal ideation and suicide attempts between LGB persons and their peers. Sexual orientation was found to exert significant interaction effects with risk markers for both suicidal ideation and suicide attempts. Specifically, problem drug use was more strongly associated with suicidal ideation among non-LGB respondents than among LGB

TABLE 1—Sample Demographics and Adjusted Odds Ratios for Suicidal Ideation and Suicide Attempts by Sexual Orientation Among Adolescents and Young Adults: National Longitudinal Study of Adolescent Health, 2001–2002

	Unweighted Total (Weighted %)			Adjusted Wald F ^a or AOR (95% CI)
	Total Sample, No. (%)	Non-LGB, No. (%)	LGB, No. (%)	
Gender				14.37**
Female	7478 (49.1)	7207 (48.7)	271 (60.1)	
Male	6711 (50.9)	6535 (51.3)	176 (39.9)	
Race ^b				
White	8955 (74.0)	8648 (73.8)	307 (81.2)	5.62*
African American	2978 (15.8)	2905 (16.0)	73 (9.9)	6.59*
Native American	410 (2.4)	397 (2.3)	13 (2.4)	0.01
Asian	1056 (3.9)	1031 (4.0)	25 (2.3)	2.64
Biracial	589 (3.6)	566 (3.6)	23 (4.0)	0.12
Ethnicity				0.72
Hispanic	2307 (11.7)	2212 (11.6)	95 (13.4)	
Non-Hispanic	11860 (88.3)	11510 (88.4)	350 (86.6)	
Residence at wave 1 ^c				0.91
Urban	7671 (51.8)	7408 (51.5)	263 (55.1)	
Nonurban	6405 (48.2)	6226 (48.5)	179 (44.9)	
Suicidal ideation ^d				2.94 (2.06, 4.19)
Yes	841 (6.6)	762 (6.3)	79 (17.2)	
No	12997 (93.4)	12638 (93.7)	359 (82.8)	
Suicide attempt ^e				2.96 (1.41, 6.21)
Yes	218 (1.7)	198 (1.6)	20 (4.9)	
No	13616 (98.3)	13199 (98.4)	417 (95.1)	

Note. LGB = lesbian, gay, or bisexual; AOR = adjusted odds ratio; CI = confidence interval. Mean age was 22.3 years for both LGB and non-LGB respondents, with standard errors of 0.17 and 0.12 years, respectively.

^aUsed in place of χ^2 for weighted data.

^bRespondents who identified with 2 or more races were classified as biracial and excluded from the other racial categories.

^cResidence in an urban or nonurban area at Wave 1 determined by census tract.

^dSuicidal ideation within the past 12 months was measured with 1 item, which was dichotomized. Reference is LGB respondents. Adjusted for race, gender, and age.

^eSuicide attempt within the past 12 months was measured with 1 item, which was dichotomized. Reference is LGB respondents. Adjusted for race, gender, and age.

* $P \leq .05$; ** $P = .019$; *** $P \leq .001$.

and young adults may need a different treatment focus and alternative points of entry to health services. Elucidation of risk markers specific to LGB individuals will be necessary to support the design and evaluation of suicide prevention interventions. ■

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Contributors

V.M.B. Silenzio originated the study and supervised all aspects of its implementation. J.B. Pena completed the statistical analyses and assisted in writing the article. P.R. Duberstein assisted in originating the study and writing the article. J. Cerel assisted in originating the study and in writing and editing the article. K.L. Knox assisted in the statistical analyses and in editing the article.

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Human Participant Protection

This study was approved by the research subjects review board of the University of Rochester Medical Center.

References

1. D'Augelli AR, Hershberger SL, Pilkington NW. Suicidality patterns and sexual orientation-related factors among lesbian, gay, and bisexual youths. *Suicide Life Threat Behav.* 2001;31(3):250–264.
2. Remafedi G, French S, Story M, Resnick MD, Blum R. The relationship between suicide risk and sexual orientation: results of a population-based study. *Am J Public Health.* 1998;88:57–60.
3. Faulkner AH, Cranston K. Correlates of same-sex sexual behavior in a random sample of Massachusetts high school students. *Am J Public Health.* 1998;88:262–266.
4. Bagley C, Tremblay P. Suicidal behaviors in

respondents. Similarly, the association between depression and suicide attempts was stronger among non-LGB respondents than among LGB respondents.

Consistent with earlier findings,¹¹ we observed higher adjusted rates of suicidal ideation and suicide attempts among LGB adolescents and young adults than among non-LGB respondents. It has been proposed that suicidal ideation or suicide attempts may represent something fundamentally different for LGB and non-LGB youths.²² Alternatively, the consistently elevated risk found in this and in previous studies, which con-

trolled for idiosyncratic variables such as victimization or parental support,^{23,24} may be mediated by factors that have not yet been tapped in research.

Despite the limitations inherent to secondary data analyses, our findings point to the need for research targeting suicide-related thoughts and behavior among LGB adolescents and young adults. Addressing depression or problem drug use is not unimportant; rather, more information is needed about the nature and source of distress that is driving suicidal behavior in this population. We tentatively conclude that LGB adolescents

TABLE 2—Stratified Analyses of Risk Factors for Suicidal Ideation and Suicide Attempts in the Past Year: National Longitudinal Study of Adolescent Health, 2001–2002

	Non-LGB Respondents, AOR (95% CI)	LGB Respondents, AOR (95% CI)
Suicidal ideation		
Problem drinking ^a	2.47 (2.05, 2.98)*	2.04 (1.02, 4.08)*
Problem drug use ^a	3.59 (2.80, 4.59)*	1.28 (0.56, 2.94)
Depression ^b	1.25 (1.22, 1.28)*	1.29 (1.16, 1.44)*
Suicide attempts		
Problem drinking ^a	2.58 (1.78, 3.76)*	1.97 (0.42, 9.12)
Problem drug use ^a	4.84 (3.09, 7.59)*	1.78 (0.46, 6.91)
Depression ^b	1.29 (1.23, 1.35)*	1.11 (0.99, 1.25)

Note. LGB = lesbian, gay, or bisexual; AOR = adjusted odds ratio; CI = confidence interval. Adjusted for age, race, and gender.

^aProblem drinking and problem drug use in the preceding 12 months were coded as present if the respondents answered yes to any of the 6 items in each domain. Dichotomous; reference group = no problem drinking.

^bDepression was measured in the adolescent health survey with 9 items from the Center for Epidemiologic Studies Depression Scale.²⁰ For every 1-unit increase in the score, the odds of suicidal ideation or suicide attempts increased by the amount shown (e.g., a 1-unit increase in the score increased the likelihood of reporting suicidal ideation by 25% among the non-LGB respondents and 29% among the LGB respondents).

*Significant at $P \leq .05$.

TABLE 3—Analyses With Interaction Terms of Risk Factors for Suicidal Ideation and Suicide Attempts in the Past Year Among Adolescents and Young Adults: National Longitudinal Study of Adolescent Health, 2001–2002

Non-LGB vs LGB Respondents	Exponent of Interaction Term ^a (95% CI)
Suicidal Ideation	
Problem drinking ^b	1.21 (0.59, 2.51)
Problem drug use ^b	2.80 (1.19, 6.57)*
Depression ^c	0.97 (0.86, 1.08)
Suicide attempts	
Problem drinking ^b	1.31 (0.27, 6.38)
Problem drug use ^b	2.68 (0.65, 11.45)
Depression ^c	1.15 (1.01, 1.31)*

Note. LGB = lesbian, gay, or bisexual; CI = confidence interval. Adjusted for age, race, and gender.

^aExponent of interaction term = $OR_{non-LGB} / OR_{LGB}$.

^bProblem drinking and problem drug use in the preceding 12 months were coded as present if the respondents answered yes to any of the 6 items in each domain. Dichotomous; reference group = no problem drinking.

^cDepression was measured in the adolescent health survey with 9 items from the Center for Epidemiologic Studies Depression Scale.²⁰ For every 1-unit increase in the score, the odds of suicidal ideation or suicide attempts increased by the amount shown (e.g., a 1-unit increase in the score increased the likelihood of reporting suicidal ideation by 25% among the non-LGB respondents and 29% among the LGB respondents).

*Significant at $P \leq .05$.

homosexual and bisexual males. *Crisis*. 1997;18: 24–34.

5. Remafedi G. Suicidality in a venue-based sample of young men who have sex with men. *J Adolesc Health*. 2002;31:305–310.

6. Kitts RL. Gay adolescents and suicide: understanding the association. *Adolescence*. 2005;40: 621–628.

7. Wichstrom L, Hegna K. Sexual orientation and suicide attempt: a longitudinal study of the general Norwegian adolescent population. *J Abnorm Psychol*. 2003;112(1):144–151.

8. Fergusson DM, Horwood LJ, Ridder EM, Beautrais AL. Sexual orientation and mental health in a birth cohort of young adults. *Psychol Med*. 2005;35(7): 971–981.

9. Pinhey TK, Millman SR. Asian/Pacific Islander adolescent sexual orientation and suicide risk in Guam. *Am J Public Health*. 2004;94:1204–1206.

10. Garofalo R, Wolf RC, Wissow LS, Woods ER, Goodman E. Sexual orientation and risk of suicide attempts among a representative sample of youth. *Arch Pediatr Adolesc Med*. 1999;153(5):487–493.

11. Russell ST, Joyner K. Adolescent sexual orientation and suicide risk: evidence from a national study. *Am J Public Health*. 2001;91:1276–1281.

12. Kraemer HC, Kazdin AE, Offord DR, Kessler RC, Jensen PS, Kupfer DJ. Coming to terms with the terms of risk. *Arch Gen Psychiatry*. 1997;54: 337–343.

13. Pearson JL, Stanley B, King CA, Fisher CB. Intervention research with persons at high risk for suicidality: safety and ethical considerations. *J Clin Psychiatry*. 2001;62(suppl 25):17–26.

14. Bearman PS, Jones J, Udry JR. The National Longitudinal Study of Adolescent Health: study design 2004. Available at: <http://www.cpc.unc.edu/>

projects/addhealth/design. Accessed January 6, 2006.

15. Resnick MD, Bearman PS, Blum RW, et al. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA*. 1997;278(10):823–832.

16. Lesbian Gay Bisexual Youth Sexual Orientation Measurement Work Group. *Measuring Sexual Orientation of Young People in Health Research*. San Francisco, Calif: Gay and Lesbian Medical Association; 2003.

17. Saewyc EM, Bauer GR, Skay CL, et al. Measuring sexual orientation in adolescent health surveys: evaluation of eight school-based surveys. *J Adolesc Health*. 2004;35(4):345.e1–15.

18. Cerel J, Roberts TA. Suicidal behavior in the family and adolescent risk behavior. *J Adolesc Health*. 2005;36(4):352.e9–16.

19. Cerel J, Roberts TA, Nilsen WJ. Peer suicidal behavior and adolescent risk behavior. *J Nerv Ment Dis*. 2005;193(4):237–243.

20. Radloff LS. The CES-D scale: a self report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1:385–401.

21. Jaccard J. Interaction effects in logistic regression. Thousand Oaks, Calif: Sage; 2001.

22. Savin-Williams RC. Suicide attempts among sexual-minority youths: population and measurement issues. *J Consult Clin Psychol*. 2001;69(6):983–991.

23. D'Augelli AR, Grossman AH, Salter NP, Vasey JJ, Starks MT, Sinclair KO. Predicting the suicide attempts of lesbian, gay, and bisexual youth. *Suicide Life Threat Behav*. 2005;35(6):646–660.

24. Eisenberg ME, Resnick MD. Suicidality among gay, lesbian and bisexual youth: the role of protective factors. *J Adolesc Health*. 2006;39(5):662–668.